

**What is claimed is:**

1. A color wheel apparatus, comprising:  
a color filter in which red, green and blue colors  
5 are formed in a spiral shape; and  
a reflective plate opposed to the color filter to  
reflect an incident light reflected and emitted from the  
color filter into the color filter again.
- 10 2. The color wheel apparatus as claimed in claim 1,  
wherein the color filter takes a spiral shape in which red,  
green and blue colors are entered toward the rotation  
center direction.
- 15 3. The color wheel apparatus as claimed in claim 1,  
wherein the color filter is provided on a circular plate,  
and the reflective plate is provided at the rear side of  
the circular plate.
- 20 4. The color wheel apparatus as claimed in claim 1,  
wherein the reflective plate has a relatively smaller size  
than the color filter.
- 25 5. A color-separating apparatus for a liquid crystal  
projector of single panel type, comprising:  
a color wheel including a color filter in which red,  
green and blue colors are formed in a spiral shape, and a  
reflective plate opposed to the color filter to reflect an  
incident light reflected and emitted from the color filter  
30 into the color filter again;  
a condensing lens for focusing a color light emitted  
from the color wheel;  
a polarizing prism for reflecting and transmitting an

incident light inputted from the condensing lens in accordance with a polarized direction;

a display device for reflecting the color light reflected from the polarizing prism and being incident thereto in accordance with an image signal to implement a picture light loaded with picture information; and

a projective lens for projecting the picture light from the display device on an expanded scale.

6. The color-separating apparatus as claimed in claim 5, wherein the color filter takes a spiral shape in which red, green and blue colors are entered toward the rotation center direction.

7. The color-separating apparatus as claimed in claim 5, wherein the color filter is provided on a circular plate, and the reflective plate is provided at the rear side of the circular plate.

8. The color-separating apparatus as claimed in claim 5, wherein the reflective plate has a relatively smaller size than the color filter.

9. A color-separating apparatus for a liquid crystal projector of single panel type, comprising:

a color wheel having alternating red, green and blue concentric circles; and

a full-reflecting mirror, being fixed to an incidence surface of the color wheel, for reflecting an incident light reflected and emitted from the incidence surface of the color wheel toward the color wheel.

10. The color-separating apparatus as claimed in claim 9,

wherein the full-reflecting mirror is fixed to the incidence surface of the color wheel in parallel.

11. The color-separating apparatus as claimed in claim 9,  
5 wherein the color wheel has the red, green and blue concentric circles spaced at the same distance  $d$  (wherein  $d$  is a positive number meeting a relationship of  $d > 0$ ).

12. The color-separating apparatus as claimed in claim 9,  
10 wherein a rotation axis of the color wheel makes a non-axial rotating motion at a position spaced at the same distance  $d$  from a center axis of the concentric circles.

13. The color-separating apparatus as claimed in claim 9,  
15 further comprising:  
a driving motor for making a non-axial rotation motion of the color wheel.

14. The color-separating apparatus as claimed in claim 9,  
20 further comprising:  
a condensing lens for focusing a color light emitted from the color wheel;

a polarizing prism for reflecting and transmitting an incident light inputted from the condensing lens in  
25 accordance with a polarized direction;

a display device for reflecting the color light reflected from the polarizing prism and being incident thereto in accordance with an image signal to implement a picture light loaded with picture information; and

30 a projective lens for projecting the picture light from the display device on an expanded scale.

15. The color-separating apparatus as claimed in claim 9,

wherein the color wheel includes five color areas consisting of red, green, blue, red and green color areas to image an illuminating light on three areas of the five color areas.

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